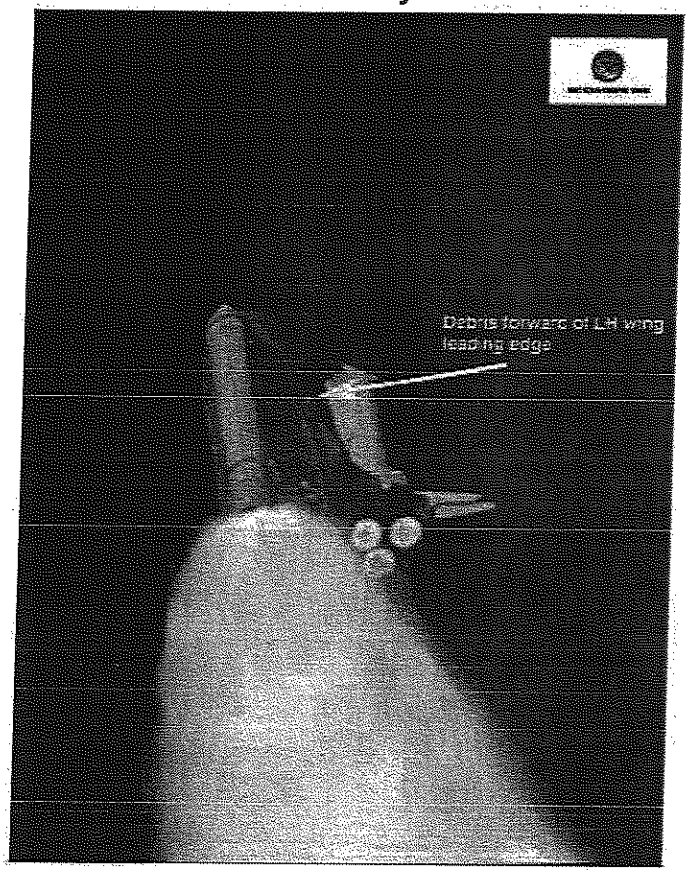
NASA

SECTION 10

STS-107
Launch+4 Day
Consolidated Film/Video Report
KSC, JSC, MSFC and Program Integration
Film/Video Analysis Teams



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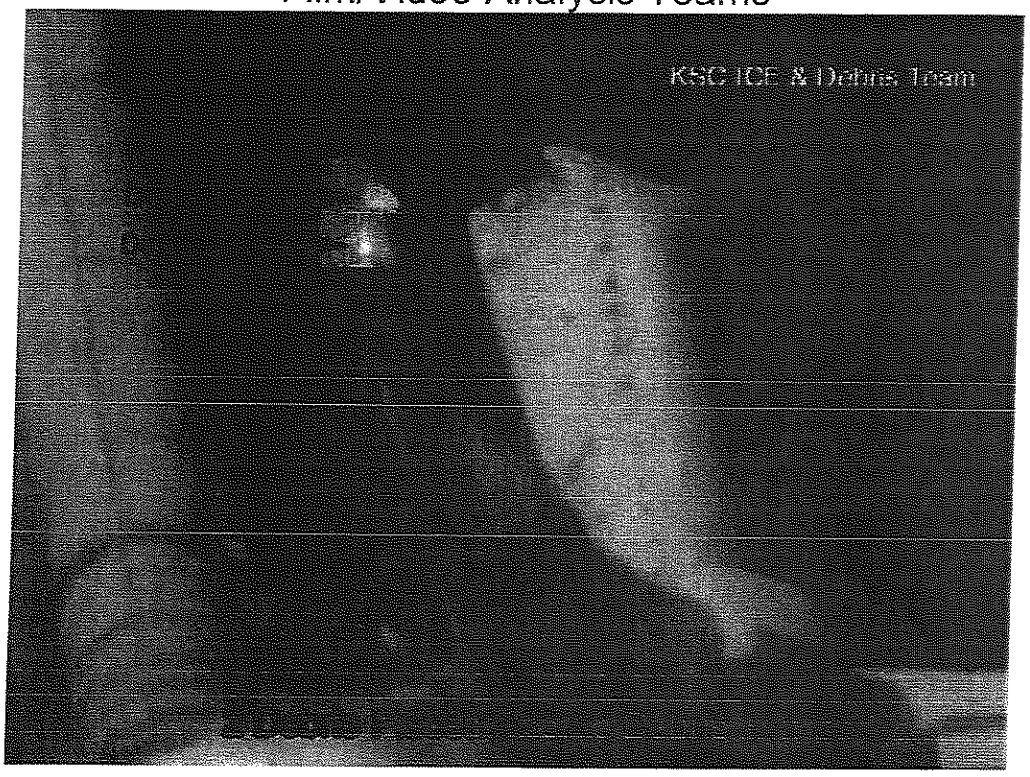

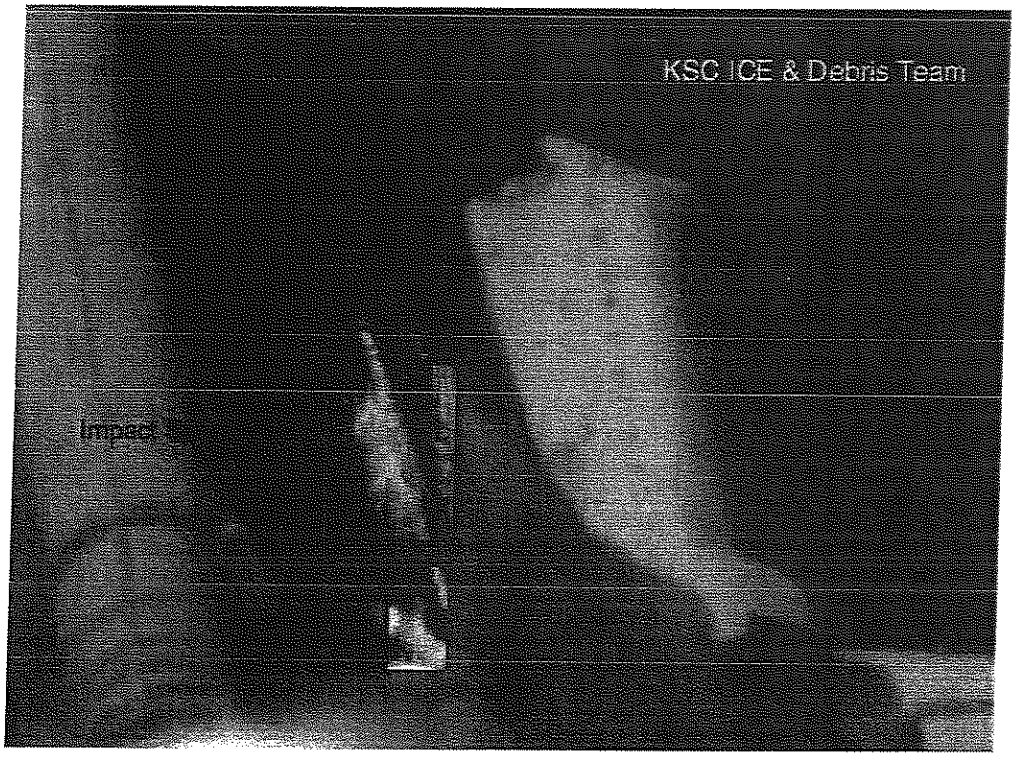

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Comparison views of the strike area immediately before and after the event were examined for indications of damage to the wing. The resolution on the films and videos is insufficient to see individual tiles. Of the multiple views that should have been available to view this event, many were unuseable. Based on the resolution of the views available, no conclusions can be reached on the extent of any damage that may have occurred from this event.

Secondary effects from the spray of materials following the strikes was also considered. The MER was contacted to determine the Elevon positions at the time of the strike. Since the Left Inboard Elevon was slightly down, there is also the possibility of strikes there.

Time		Elevon Position (deg)	
G.m.t.	MET (sec)	LIB	LOB
016:15:40:20	80	2.56	-4.87
016:15:40:21	81	1.63	-4.87
016:15:40:22	82	0.71	-4.87
016:15:40:23	83	0.24	-3.71
016:15:40:24	84	0.24	-2.09

Note: For the elevons, a negative deflection is Up, positive is Down

A preliminary assessment of debris impact conditions predicted an impact to the Orbiter lower surface at location Xo1049, Yo185 (results provided on January 17, 2003) Impact velocity was estimated to be approximately 750 ft/sec with an impact angle estimated to be less than 20 degrees.
Further analysis will be performed.

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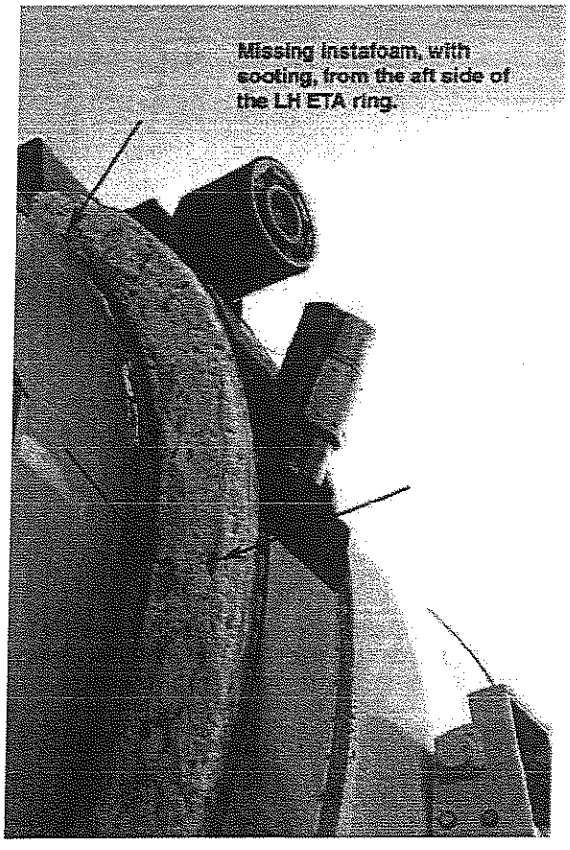
CFVR–107-02

Camera: E-220, E-222, E-223, E-224
Time: UTC 15:39:33.196

Approximately 33 seconds after T-0 (15:39:33.196 UTC) several particles are observed falling away from the –Z portion of the LH SRB ETA ring. Particles are probably pieces of the instafoam closeout on the ETA ring. (E-220, E-222, E-223, E-224)

From Post-Flight SRB Inspection:

The LH ETA ring instafoam closeout exhibited missing foam on the aft side. The areas of missing foam were sooted, indicating they came off in flight and not as the result of water impact. The largest area was approximately 3 inches in diameter by 2-1/2 inches deep. This appears to correlate with the debris seen coming from this area on the tracking films (E-220, E-222, E-223, E-224).



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22 January 2003

This report consolidates the multi-center post flight photo reviews into a single list of observations for engineering review. This integrates the photo review process into the IFA / PRACA process to ensure that the identified observations are assessed and dispositioned prior to the next flight per established problem reporting criteria.

CFVR–107-01

Camera: E204, E208, E212
Time: UTC 016:15:40:21.699

During ascent at approximately 81 seconds MET, debris was seen to originate from an area near the ET/Orbiter forward attach bipod. Due to lighting conditions in the area, it is not known whether the debris originated as a single item which broke up or if it originated as several separate items. Four objects are seen or surmised from the data.

Object #1, the largest of the items, was a light-colored piece of debris which appeared (016:15:40:21.699 UTC) to move outboard in a -Y direction, then fell aft along the left Orbiter fuselage and struck the underside (-Z) of the leading edge of the left wing (016:15:40:21.882 UTC). The strike appears to have occurred on or relatively close to the wing glove near the Orbiter fuselage. After striking the left wing, the debris broke into a spray of white-colored particles that fell aft along the underside (-Z side) of the Orbiter left wing. The spray of particles was last seen near the LSRB exhaust plume.

Object #2, darker and smaller in appearance than the first, is visible in the frame immediately following the appearance of Object #1. Its travel path seems to be slightly more outboard and more in the –Z direction than the first. This object actually strikes the wing before Object #1. (A spray of particles is seen traversing aft prior to the strike from Object #1).

Object #3 is not seen directly in any views. However, evidence of its existence comes from a second spray of particles at the same time as and parallel to the spray from Object #2.

Object #4 does not appear to strike the Orbiter, but is seen as it crosses over the ET vertical strut. This object may be part of the debris cloud from Object #2/3.

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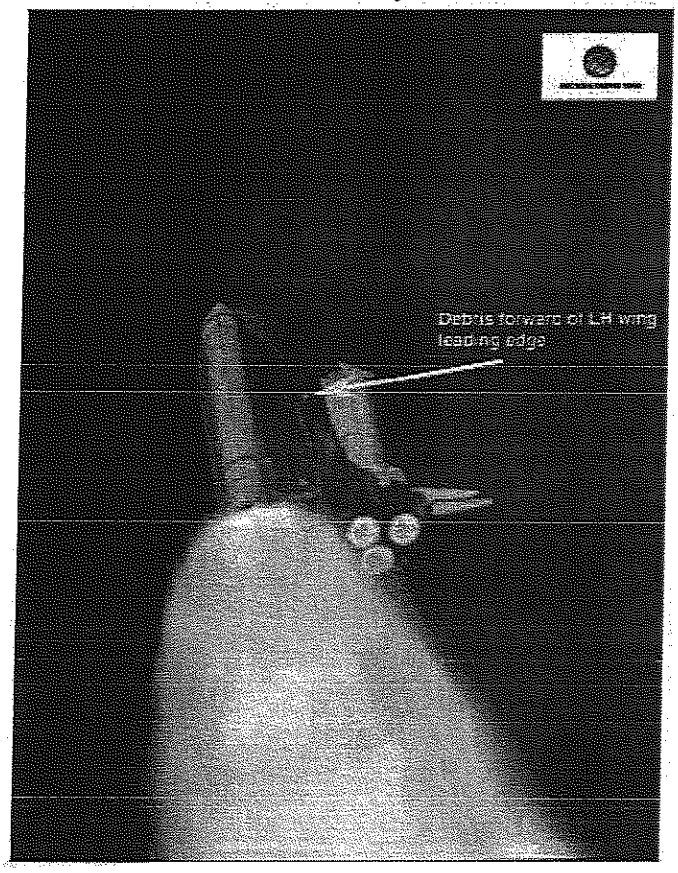

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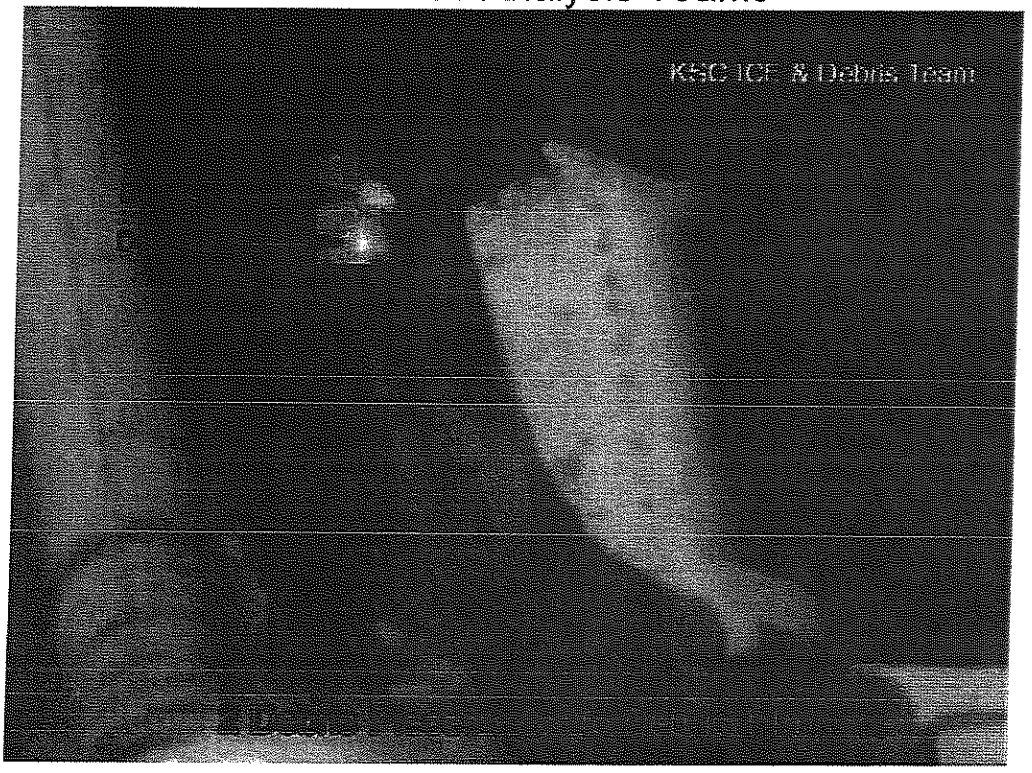

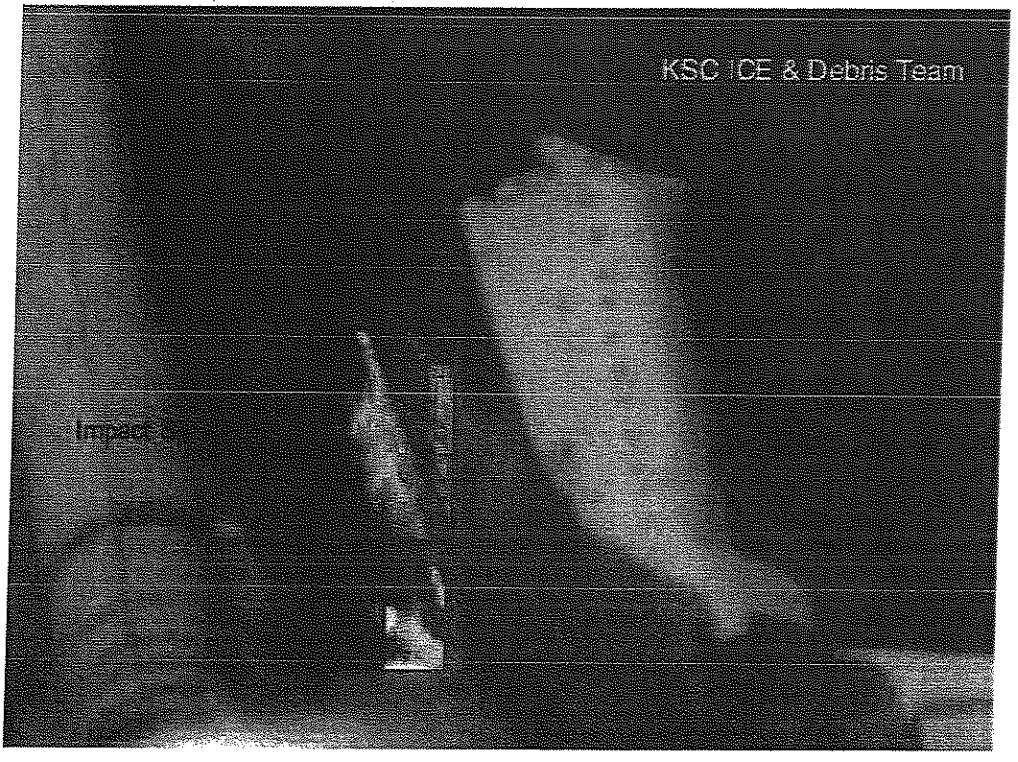

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